The Relationships between Depression, Self-Efficacy, Physical Disability and Chronic Pain

Authors

Maryam Tehranizadeh,[1] *PhD*
Fatteme Raiisi,[2*] *PhD*

[1] Psychology Faculty, Payame-noor University, Karaj, Iran.
[2] Cognitive Science. Shaid Chamran Bulv, Cognitive science Buvl.; Edalat Sq, Pardis city phase 4, Tehran, Iran.

* Correspondence
Address: Institute of Cognitive Science. Shaid Chamran Bulv, Cognitive science Buvl.; Edalat Sq, Pardis city phase 4, Tehran, Iran.
Tel: +982176291130
Fax: +98 21 76291140
P.O.Box: 1658344575
Email: Elhamaraiisi@gmail.com

A B S T R A C T

Aim: Chronic pain may be related to a set of biological-psychological-social factors. The purpose of this study was to investigate the relationships between depression, pain self-efficacy, physical disability and chronic pain.

Method and Instruments: This study had a descriptive – correlational method. In this study 100 patient with chronic pain who were referred to pain clinics in Tehran (2018) were studied. The sample was selected by purposive sampling method. The participants completed the physical disability questionnaire, pain self-efficacy questionnaire, Beck depression inventory and pain history questionnaire. To test the hypotheses, Pearson correlation and multiple regression tests were used. Data were analyzed by SPSS-25.

Findings: Depression, pain self-efficacy and physical disability inpatient with chronic pain were assessed. According to the results of this study, 9.6% of the variance in chronic pain in patient with chronic pain were explained by depression, pain self-efficacy and physical disability.

Conclusion: To conclude, it seems that chronic pain is affected by some psychological and physiological factors as depression and self-efficacy and physical disabilities.

Keywords: Chronic Pain, Depression, Pain Self-efficacy, Physical Disability.

Introduction

Extensive theories and researches have been presented with the aim of determining the psychological factors affecting pain [1]. Pain can affect patient and non-patients' entire lives, in other words, their quality of life[2,3]. In 1965, Melzac and Casey proposed the gate control theory for pain. This theory necessarily provided a descriptive basis for the idea that sensory input could be modified by certain psychological processes[4]. Phillips (1987) defines a model that describes the effect of cognition on pain-related behavior. This model emphasizes patients' expectations about the effectiveness of their actions as well as their beliefs about their capacity to control painful events [5]. Adaptation to pain is a function of pain beliefs as well as coping strategies that a person uses when faced with pain. Patients who viewed their pain as a mysterious and incomprehensible phenomenon negatively assessed their ability to control pain[6].

One of the consequences of chronic pain is physical disability. Disability can often be proposed of as a pattern of behavior that is inferred when the injury actually occurred and placed limitations on the individual's abilities, performance in routine roles, and personal activities[7]. Pain changes function to varying degrees. However, the severity of patients' disability was more related to the belief that general situations and chronic pain-related situations were uncontrollable than to disease-related variables[8]. The results showed that pain indirectly affects physical disability through the cognitive factors of self-efficacy[9].

Self-efficacy is the feeling of worthiness, self-efficacy and ability to cope with life and belief in the ability to perform the necessary behaviors for work to reach the desired position[10].

Corresponding Author: Institute of Cognitive Science. Shaid Chamran Bulv, Cognitive science Buvl.; Edalat Sq, Pardis city phase 4, Tehran, Iran. Tel: +982176291130; Fax: +98 21 76291140; P.O.Box: 1658344575; Email: Elhamaraiisi@gmail.com

Patients' performance depends to a large extent on their self-efficacy expectations. If self-efficacy is low, patients avoid activities that may increase pain [11].In a study, results showed there is not significant correlation among weight, body mass index, and referred pain neither in relation to self-efficacy, nor in relation to pain/disability [12].

Depression is one of the most common mental health problems in people with chronic pain. On the other hand, depressive disorders are common among patients with chronic pain[13]. In general, people with chronic pain are more likely to be depressed [14]. It is not yet known whether chronic pain causes depression or whether depression affects chronic pain [15].

Various studies have been performed on the severity of pain that emphasize the psychological factors of pain. For example; a study showed low self-efficacy is associated with disability in patients with chronic pain[16]. In a study of patients with chronic low back pain, the researchers found thatthere are correlations between pain intensity and disability and between pain intensity and depression was weak positive and between disability and depression was moderatepositive   [17].

A study showed the prevalence of chronic pain in hands, wrists, elbows, shoulders, neck, hip joints, knees, ankles, legs, and back were noticeable in people with symptoms of depression compared to those without depressive symptoms[18].In meta-analysis study researchers found there is robust correlate between key outcomes related to chronic pain self-efficacy and chronic pain[19].

However, according to literature review,in many psychological studies, behavioral, cognitive and emotional factors have been studied as the main causes of chronic pain. However, it seems it can not one factor that to be the cause of chronic pain, and these pains have intertwined factors that vary from person to person.Therefore, according to these reasons, the purpose of this study was to investigate the relationships between depression, pain self-efficacy ,physical disability andchronic pain.

Method and Instruments

In this cross-sectional study 100 patients with chronic pain (such as skeletal pain) who were referred to pain clinics in Tehran (2018) were studied. The sample was selected by purposive sampling method. In this study the following questionnaire were used to collect data.

Demographic questionnaire: that includes variables such as gender, age, the duration and intensity of pain, and so on.

Physical disability questionnaire:This questionnaire was developed by Roland and Morris in 1983. This questionnaire has 24 questions, that content of which is a range of physicaldisabilities caused by pain.The patient's score on this test varies between zero and 24, and a higher score indicates more severe physical disability. The reliability, validity and sensitivity of this questionnaire have been confirmed among patients with chronic pain [20].In the present study, Cronbach's alpha of this questionnaire was 0.83.

Pain self-efficiency questionnaire: This questionnaire was created by Nicholas in 2007. This questionnaire contains 10 items and measures the severity of a person's belief in the ability to perform daily activities despite the presence of physical pain. The score of this questionnaire can vary between zero and 60. A higher score indicates a stronger belief in doing activities despite the pain. This questionnaire has good reliability (test-retest reliability) and internal consistency coefficient (0.92 Cronbach's alpha)[21]. In the present study, Cronbach's alpha of this questionnaire was 0.89.

Beck depression inventory: This questionnaire contains 21 sections.Each section contains 4 phrases that are arranged according to the signs and symptoms of depression and their severity,and they are given a score from zero to 3. A score of zero in each section indicates the absence of that sign and a score of 3 indicates the existence of its most severe form. The sum of the scores of the sections constitutes the total score of the subject on this scale (a number between zero and 63).On this scale, a score of 0 to 9 is a sign of normality, a score of

10 to 15 is a sign of mild depression, a score of 16 to 23 is a sign of moderate depression, and a score above 24 is a sign of severe depression.Miller and Seligman studies reported a reliability coefficient of two halves with a Spriman-Brown correction of 93% and a retest reliability of 75%[22].In the present study, Cronbach's alpha of this questionnaire was 0.82.

Pain History Questionaire: This questionnaire uses 27 phrases to collect information in the following three areas: The first section has 7 questions and in this section provides information about age, gender, ethnicity, level of education, marital status and job.Scoring in this section is nominal scoring.The second section has 5 questions and provides information on the prevalence of pain over a lifetime. This part of the questionnaire asks the respondent to say whether he/she has felt any pain in any part of his/her body during his/her life due to which he/she has either referred to a doctor or taken medicine to relieve it.In addition, this section of the questionnaire provides information about the persistence of pain and its effect on a person's performance. The scoring of this section is also in the form of nominal scoring. The third part of the questionnaire has 15 questions and provides information on the prevalence of pain in the last 6 months.In this section, there are questions to find out if there is pain in any part of the head, neck and shoulders, chest, abdomen, back and back and limbs (during the last 6 months). Subjects were asked to report only pain that a whole day or more has lasted.In addition, subjects were asked to determine if the pain had persisted over the past 6 months or not. Moreover, this section of the questionnaire provides information about the duration of medication and the effect that pain has on people's lives. The scoring of this section is also based on the items provided nominally. Data were analyzed by using SPSS 25. To test the hypotheses, in addition to descriptive statistics such as Mean and Standard Deviation, Pearson correlation and multiple regressionswere used. In this study, all ethical principles are respected. All participants were informed about the procedures of the study. They were satisfied to be studied and signed the consent form.

Findings
In this study 100 patient with chronic painincluding 50 men and 50 women with mean age of 61.5 years old (SD=12.2) were studied. 35 (70%) of women were married, 10 (20%) of women were divorced, 4(8%) of women had lost their husbands and 1 (1%) of woman was not married. The mean age of women was 59(SD= 6.8) years. Twenty women (40%) of women were employees, 10(20%) of them were retired and 20(40%) were housewives. 34(68%) of women had a diploma and a sub-diploma, 11 (22%) had a bachelor's degree and 5 (10%) had a master's degree. 42 men were married. 8 men had divorced. The mean age of men was 64 (SD= 5.4) years. 15 (30%) of men were employees, 30(60%) of them were retired and 5(10%) were unemployed. 24(48%) of men had a diploma and a sub-diploma, 18(36%) had a bachelor's degree and 8(16%) had a master's degree. The rest information about mean and standard deviation of patients' response to research variables are given in Table 1.

To test sub-hypotheses of the research, using the Pearson correlation coefficient method, the correlation between predictor (chronic pain) and criterion variables (depression, pain self-efficacy and physical disability) was first evaluated and the coefficients obtained shownin Table 2. As the result, there issignificant relationship between the variables ofdepression, pain self-efficacy ,physical disability and chronic pain (Table 2).

To test the main and specific hypotheses of the research, that is, predicting chronic pain based on depression, pain self-efficacy and physical disability, multiple regression analysis was used and the results showed that the obtained R^2 value (0.96) means that 9.6% of variance of chronic pain is explained by depression, pain self-efficacy and physical disability. In other words, 9.6% of the observed dispersion in the chronic pain variable is explained by the variable of

Table 1. Summary of statistical indicators related to participants' score in participants' studied variables (N = 100)

Variables	Mean	Standard deviation
Self-efficacy	37.16	1.25
Physical disability questionnaire	18.24	3.93
Beck depression inventory	53.24	0.990
Lifetime prevalence of pain	8.38	1.13
Pain in the last 6 months.	6.72	1.53

Table 2. Summary of Pearson correlation coefficient test results among variables (N = 100)

Components	Chronic pain	Depression	Pain self-efficacy	Physical disability
	R	R	R	R
Chronic pain	1**	0.20**	-0.39**	0.15**
Depression	-	1**	-	-
Pain self-efficacy	-	-0.58**	1*	-
Physical disability	-	0.35**	-0.52	1

* Significant at the level of <0.05
**Significant at the level of <0.01

Table 3. Summary of regression analysis for predicting quality of life based on pain (N = 100)

Predictors	Dependent variable: Chronic pain			
	Standardized coefficients	Not standardized coefficients	T	Sig
Constant number		8.64	1.30**	<0.001
Depression		0.13	1.24**	<0.001
Pain self-efficacy		0.20	0.69**	<0.001
Physical disability		0.17	1.16**	<0.001

**R= 0.16 ; R^2 = 0.96 ; Adjusted R^2 = 0.21 ; F =3. 89.
* Significant at the level of <0.05; **Significant at the level of <0.01

depression, pain self-efficacy and physical disability. The observed R value (0.16) also indicates that the linear regression model can be used for prediction. In addition, the calculated F ratio (3.89) is significant at a confidence level of 99%. Therefore, it can be concluded that there is a significant correlation between the variables studied and the chronic painvariable. As a result, evidence is sufficient to accept the main hypothesis of the research. By referring to *t* statistics and meaningful levels, it can be concluded that both variable of depression, pain self-efficacy,physical disability andchronic pain variable have a significant correlation. The sign of β coefficients showed that depression, pain self-efficacy and physical disability has a positive and significant correlation with Quality of Life (QOL). Finally, according to these explanations and coefficients, the regression equation can be calculated based on the not standardized regression coefficients (Table3)

Discussion
The purpose of this study was to investigate the relationships between depression, pain self-efficacy, physical disability and chronic pain. This finding is consistent with the study of Sheng et al. [11], Karasawa et al. [14],Ahmadi Ahangar et al. [16] andJackson et al.[17]. All these studies showed that chronic pain is related to depression, pain self-efficacy and physical disability. Therefore, the evidence is sufficient for this assumption.

As mentioned earlier, pain and its severity are influenced by psychological factors and psychological factors can be involved in creating and controlling pain. Moreover, some psychological variables play a greater role in pain. For example; high self-efficacy can be effective in controlling pain, resulting in reduced depression and physical disability. Accordingly, a study has shown that both pain intensity and self-efficacy contribute to the development of disability and depression in patients with chronic pain. Therefore, the lack of belief in one`s own ability to manage pain, cope

and function despite persistent pain, is a significant predictor of the extent to which individuals with chronic pain become disabled and/or depressed [23].
Another finding of this study showed that there was predicted chronic pain based on depression, pain self-efficacy and physical disability. This result is consistent with the study of Garbi Márcia de Oliveira Sakamotoet al.[15]that the back chronic painwas predicted by pain intensity, disability and depression, theresults of Holmes et al. [12], that there was a significant relationship between chronic pain and depression, the severity of pain and the results of Ferrariet al.[10] that showed there is relationship between self-efficacy, disability, pain and sociodemographic characteristics in chronic low back pain. Therefore, the evidence is sufficient for this assumption.
Byexplaining this hypothesis, it can be said that psychological factors such as self-efficacy can predict the persistence of chronic pain. In fact, self-efficacy is a very important variable in predicting chronic pain[24]. On the other hand, self-efficacy is directly related to depression and physical disabilitiesin chronic pain[25]. The relationships between these variables and their effect on pain have been investigated in various studies. For example, in a study in chronic musculoskeletal pain patients, pain intensity is explained by physical disability and self-efficacy[26].
In addition, the findings of this study have developed the results of previous studies. Moreover, this study has certain limitations, including, cross-sectional type of study, lack of control of modulator variables ,patients with chronic pain and purposive sampling. Therefore, it is recommended that future studies provide a more comprehensive study with a higher sample size and probabilistic samplingin order to generalize the findings.

Conclusion
To conclude, it seems that chronic pain is affected by some psychological factors as depression and self-efficacy and

physiological factors as physical disabilities.

References
1. Linton SJ, Shaw W. Impact of Psychological Factors in the Experience of Pain, Phys Ther, 2011; 91(5): 700–711.
2. Raiisi F, Amini F, Khani MM.Investigating the Effect of Skeletal-muscular Pains on the Quality of Life in Nursing and Midwifery Students. IJMPP, 2020; 5(2): 336-343.
3. Raiisi F. The Relationships between Pain Perception andQuality of Life in Addicts. IJMPP. 2020; 5(2): 350-356.
4. Innes SI.Psychosocial factors and their role in chronic pain: A brief review of development and current status. Chiropr Osteopat. 2005; 13: 6.
5. Moayedi M, Davis KD.Theories of pain: from specificity to gate control. J Neurophysiol. 2013; 109: 5–12.
6. Jacobs, M.S. Psychological Factors Influencing Chronic Pain and the Impact of Litigation. Curr Phys Med Rehabil Rep. 2013; 1:135–141.
7. TangNKY, McBeth J, Jordan KP, Blagojevic-Bucknall M, Croft P, Wilkie R. The role of pain, physical disability, and reduced social participation in insomnia onset in community dwelling older adults: a prospective cohort study. The Lancet. 2013; 282(S95).
8. De Souza L, FrankAO.Experiences of living with chronic back pain: The physical disabilities. DisabilRehabil.2007: 29(7): 587-596.
9. Sullivan M. Psychology of Pain, Self-Efficacy. In: Schmidt R., Willis W. (eds) Encyclopedia of Pain. Springer, Berlin, Heidelberg. 2007.
10. Asghari A, Nicholas M K. Pain self-efficacy beliefs and pain behaviour. A prospective study. Pain, 2001; 94 (1) 85-100.
11. Sreeja Kalapurakkel EA, Carpino MA, Alyssa Lebel MD, LES. Pain Can't Stop Me: Examining Pain Self-Efficacy and Acceptance as Resilience Processes Among Youth With Chronic Headache. J. Pediatr. Psychol, 2015; 40(9): 926-933.
12. Ferrari, S., Vanti, C., Pellizzer, M. et al. Is there a relationship between self-efficacy, disability, pain and sociodemographic characteristics in chronic low back pain? A multicenter retrospective analysis. Arch Physiother, 2019; 9(9).
13. Sheng J, Liu S, Wang Y, Cui R, Zhang X. The Link between Depression and Chronic Pain: Neural Mechanisms in the Brain. Neural Plast. 2017: 9724371.
14. Holmes A, Christelis N, Arnold C, Depression and chronic pain. Med J Aust 2013; 199 (6): S17-S20.
15. Walker AK, Kavelaars A, Heijnen CJ, DantzerR. Neuroinflammation and Co morbidity of Pain andDepression. Pharmacological Reviews. 2014; 66(1): 80–101.
16. Karasawa Y, YamadaK, Iseki M,Yamaguchi M, MurakamiY,Tamagawa T,et al.(2019).Association betweenchangein self-efficacyand reductionin disabilityamongpatientswithchronicpain. PLoSONE 14(4): e0215404.
17. Garbi Márcia de Oliveira Sakamoto S, Hortense P, Gomez Rodrigo Ramon F, Silva Talita de Cássia Raminelli da, Castanho Ana Carolina F, Sousa Fátima Aparecida Emm Faleiros. Pain intensity, disability and depression in individuals with chronic back pain. Rev. Latino-Am. Enfermagem [Internet]. 2014; 22(4): 569-575.
18. Ahmadi Ahangar A, Hosseini SR, Kheirkhah F, Karimi M, Saadat P, Bijani A, et al. Association betweenchronic pain and depression among the elderly of Amirkola city, northern Iran. Elderly Health Journal. 2017; 3(2): 74-79.
19. Jackson T, Wang Y, Wang Y, Fan H. Self-efficacy and chronic pain outcomes: a meta-analytic review. J Pain. 2014; 15(8): 800-814.
20. Roland MO, Morris RW. A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine 1983; 8: 141-144.
21. Nicholas MK.The pain self-efficacy questionnaire: Taking pain into account. EJ P, 2007, 11(2), 153-163.
22. Salamero M, Marcos T, Gutiérrez F, Rebull E. Factor study of the BDI in pregnant women. Psychological Medicine, 1994; 24: 1031-1035.
23. Arnstein P, Caudill M, Mandle CL, Norris A, Beasley R. Self-efficacy as a mediator of the relationship between pain intensity, disability and depression in chronic pain patients. Pain. 1999; 80(3): 483-491.

24. Arnstein P. The mediation of disability by self efficacy in different samples of chronic pain patients. Disabil Rehabil. 2000; 22(17):794-801.
25. Asghari A, Julaeiha S, Godarsi M. Disability and depression in patients with chronic pain: pain or pain-related beliefs?. Arch Iran Med. 2008;11(3):263-269.
26. Denison E, Asenlöf P, Lindberg P. Self-efficacy, fear avoidance, and pain intensity as predictors of disability in subacute and chronic musculoskeletal pain patients in primary health care. Pain. 2004; 111(3): 245-252.